REMARKS

Claims 2-3, 5-9 and 13-19 are pending in the application. The application has been amended according to the Examiner's suggestion concerning 35 USC 112, and changes have been made to Claim 1 to more clearly distinguish it from the cited prior art. No new material in introduced by way of these amendments.

I. The rejection under 35 USC 112

The Examiner objected to the claims being directed to an optical fibre and at the same time comprising a laser. As suggested by the Examiner, the claims have been amended as necessary to refer to "at least one fibre lasing volume". It is respectfully considered that the 35 USC 112 objection is therefore overcome.

II. The anticipation rejection of Claim 2

The Examiner rejected Claim 2 for being anticipated by Carter (USP No 2002/0191928). In his rejection the Examiner considered that the second undoped core of the present invention is disclosed by the second cladding layer 36 of Figure 3 of Carter, containing granules 40.

It is respectfully submitted however that the term "core" is well defined in the field in question, and refers to a substantially cylindrical element in an optic fibre, typically having a refractive index greater than its neighboring elements. This arrangement is designed to promote passage of light through the core and to minimize light leakage from the core. This well understood meaning of the term "core" is in fact apparent from Carter, where it refers to core 36 in Figure 3 for example.

The cladding layers of Carter, which surround the core, cannot themselves be considered cores. These cladding layers always surround an inner cladding layer or a core, and serve the purpose of largely confining light to the inner layer or core to which they are adjacent. Thus the structure and function of a cladding layer is different to that of a core, and this difference would be well understood by the skilled reader.

The present invention includes two cores, as can clearly be seen from Figure 2a for example, each of these cores serves as a dedicated light conduit, adapted such that transfer from

the second core to the first is promoted only at selected portions, as will be discussed in greater detail below.

Furthermore, Carter does not disclose at least one lasing volume comprising a pair of reflection gratings in the first fibre core, as required by Claim 2. Paragraph 58 of Carter, as referenced by the Examiner, merely states that techniques for stressing a fibre may be used in conjunction with a tunable fibre grating. It is respectfully considered that this does not constitute the disclosure of a lasing volume, either explicitly or implied.

In addition, the present invention, as defined by Claim 2, requires that the second fibre core is optically coupled to each of the lasing volumes. In other words, the present invention provides an optical fibre which is not uniform along its length. The fibre of the present invention contains defined lasing volumes along the length of the first core, and the second core is optically coupled to the first at the location of these lasing volumes. This is seen clearly in Figures 2, 3 and 6 and the corresponding text of the present application for example. To further clarify this distinction, Claim 2 has been amended to recite that the second fibre core is coupled selectively to the lasing volumes of the first fibre core.

In contrast, Carter describes a fibre which has a uniform construction along its length.

In this way, the present invention provides a fibre in which defined lasing volumes of a first core selectively receive light energy for the second pumped core. As explained in the application, this provides improved pumping efficiency, and even allows the degree of coupling, and hence pumping of each lasing volume to be controlled.

For at least these reasons, it is respectfully submitted that Claim 2 and its dependent claims are novel over Carter.

III. The obviousness rejection of Claims 2-3, 5-9 and 13-19

The Examiner additionally rejected Claim 2 as being obvious from Garman (US 4955685) in view of various other documents. Again this rejection is respectfully traversed.

In likening the teaching of Garman to the present invention the Examiner has concentrated on Figure 3 of Garman. Figure 3 of Garman discloses an optical fibre 60 including a core 62 and a cladding 64. An elliptical reflector 69 surrounds the fibre, and a light source 68 is included at one focus of the reflector. The reflector 69 and all the components contained within it cannot, it is submitted, be considered an optical fibre, which is the subject of the present claims.

Figure 3 of Garman does disclose an optical fibre 60, but the reflector and light source are explicitly stated as being external to the fibre (col. 2 line 57 and col. 5 lines 1-2 of Garman for example).

The skilled person would clearly understand what is meant by "an optical fibre", and would recognize that in the arrangement of Figure 3 of Garman, the fibre is a single core fibre, but that an external light source and reflector have been assembled about the fibre. This understanding is reinforced by col. 5, lines 8 to 14 where it is stated:

> Although the embodiment illustrated in Figure 3 would accomplish the desired results, it will be appreciated that the necessity of surrounding the optical fibre 60 and an external light source 68 within the electrical reflector 69 would be quite bulky and unsuited for underground and other limited space applications.

In contrast the fibre of the present invention has no bulky external components and would be well suited to underground and limited space applications.

Furthermore Garman merely refers to a light source 68. Nowhere is it stated or suggested that this light source is or could be an undoped optical fibre core, nor would the skilled reader find any motivation for making it such. Garman therefore does not disclose the basic structure of the present invention of an optical fibre having a first doped core and a second undoped core.

Independently of the above, it is again noted that Garman discloses a design which achieves optical gain along the entire length of the fibre, i.e. its optical properties are uniform longitudinally.

In contrast, and as noted above, the present invention as defined by Claim 2 provides an optical fibre in which light from a pump source can propagate down the second fibre core and be selectively coupled into the at least one lasing volume of the first core. In this way, light is only coupled into the first core where it is required, and consequently efficiency is improved.

Neither Carter nor Garman discloses an optical fibre having a first doped core and a second undoped core. In addition, neither of these two documents addresses the problem of providing an improved fibre laser or fibre laser array.

There would therefore be no reason for the skilled reader to take one of these documents, and attempt to combine it with a fibre laser arrangement. Even if it was attempted to adapt Carter or Garman to produce a fibre laser, a straightforward combination of the cited prior art teachings would not result in the unique arrangement defined by Claim 2 of the present invention.

It is therefore considered that the subject matter of Claim 2 is not rendered obvious by Garman or Carter, either alone or in combination with any of the cited documents.

Claims 3, 5-9 and 13-19 are considered novel and non-obvious at least by virtue of their dependency upon Claim 2.

Applicant respectfully requests favorable re-examination and allowance of all pending claims of the above-identified patent application.

Respectfully submitted,

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